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**THE MOBILITY OF TELE-MEDIATED WORK OVER
TIME**

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ORGANISATIONAL TRANSFORMATION IN A DIGITAL GLOBAL ECONOMY**

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Introduction

Unlike new computer technologies and processes which directly increase the demand for products and services, and which therefore have immediately visible economic effects, teleworking is simply a new way of doing something old. At one level it is only a relocation of work, an extension of the “take-away” phenomenon which more commonly applies to food or films. Yet increased teleworking could in principle result in real social and economic benefits. The general expansion of ICTs has been strongly linked to the prospect of growth through increased demand and increased efficiency (OECD 2000). Teleworking might lower the unit cost of labour by reducing overheads, in particular by reducing the demand for office space. It would also minimise travel to work and therefore travel costs, with benefits either to the worker or, if the saving is passed on through reduced wages, to the employer. This would of course have beneficial effects on the environment, though assessment of these potential effects is complex (Gillespie et al, 1995 and Anderson, 2001: 23-30). Furthermore, whatever people do with the time transferred from the workplace to home, there is implicitly also a social benefit derived from the freedom to control one’s time – for instance for home care purposes, although there is little evidence that teleworkers actually do this (Bailey and Kurland 2002). Teleworking might also be viewed as an aspect of “flexible employment” - a new form of working resulting from both changing technologies and changing management techniques (Gregg and Wadsworth 1999). Finally, this apparent shift of control also identifies the teleworker as a consumer. The need to have computer equipment, internet services or mobile communications raises the demand for these, whether paid for by the employee, the employer, or the self-employed. This too has important economic consequences. In sum, a radically enlarged teleworkforce could be viewed as part of a generalised modernisation characterised by new and cleaner technologies, flexible employment, lifestyle choices and both increased consumption and economic growth.

Yet many have been the critics of this vision. First, telecommuting has thus far had limited impact on how we work. There are fundamental organisational reasons why people work in groups. New technologies cannot alter these basic requirements. Second, in terms of welfare, if teleworking increases for economic reasons, this might include a resurgence of routine work from home, such as telephone sales or data entry, and could be exploitative. The social effects might therefore be negative, especially for women (Webster 1996). Third, the internet bubble has burst, and even if steadier growth occurs over a longer time than some originally predicted, there is no sign that the take-up of new domestic technologies is grounded in previously unmet social needs through which major new commercial developments could be anticipated. At the most general level, computers might be simply one more consumer luxury, like the CD player or the food mixer.

The problems of effects and meaning are mixed up with the problems of definition and measurement. There is a great deal of uncertainty over these latter aspects which also have important analytical implications. One of these concerns the distinction

between viewing telework as a characteristic of the worker as opposed to the work. For instance, it is necessary to test whether teleworking is polarised between professional workers with university degrees, for whom teleworking is perhaps a benefit, and poorly educated workers who use ICTs not to network with colleagues but to call customers or sell products. It is also necessary to test the extent to which teleworking might raise the rewards to work. These rewards are important in terms of welfare but might also represent a productivity effect. It might be that teleworkers receive higher pay than others, because they are trusted to telework, because they are successfully self-employed, because teleworking makes them more productive, or because they are professional or managerial workers who are highly paid anyway and simply need to telework at least some of the time. Alternatively, some teleworkers might be poorly paid if they are, for instance, traditional homeworkers who merely use ICTs as a work tool (e.g. homebased telephone sales).

The aim of the analysis below is to test the extent to which forms of home-working (including telework) have distinctive effects and causes over and above the personal characteristics of those who engage in them, and to examine these over time. The data are from a household panel survey undertaken in six European countries towards the end of 2001.

The data and derivation of the telework variable

Researchers of telework have repeatedly noted the lack of consensus about how the phenomenon should be defined (e.g. Felstead and Jewson, 2000). This has implications for measurement and for differing claims about the prevalence of the various practices of telework. It seems that any definition of telework should embody three components: information on the technology used; where the work is undertaken; and intensity (frequency and duration) of this work. It has not always been the case that use of an online connection from a subsidiary or non-standard workplace (including a home) to some sort of central workplace has been treated as necessary to a definition of telework. The Office of National Statistics definition in the UK used in the Labour Force Surveys (ONS 2002) requires use of a phone and a PC, but other definitions stress the importance of the online link (eWork 2000). It seems reasonable, however, to suggest that these different technological platforms represent different forms of telework, or potentially do so. The distinctions are at least worthy of investigation.

The locational element brings into play not just the home but telecottages or remote offices, as well as more fully mobile work requiring some ICT link with a main workplace. These are important distinctions, though the numbers falling into any one category might be very small for analytical purposes. Finally, perhaps time is the most important variable which will determine how we treat telework. The number of full-time teleworkers is tiny. Some studies of teleworking therefore include part-time as well as full-time workers (e.g. Huws, 1995). One British study for the UK's Department of Trade and Industry operationalises telework to include those who work at least 50% of the time in home (1998), but such definitions are clearly arbitrary. An

alternative is to take into account whether telework is full-time, “supplementary” (for instance, some part of normal work hours spent teleworking), or more specifically “spillover” work undertaken at home in the evening or weekend.

The approach taken below is open-minded about telework, showing the implications of different parameters, and hence the range of teleworking practices. By combining some of these parameters it is possible to show how a classificatory scheme could be derived.

The data derive from the two waves of the e-Living project, which is funded by the EU’s IST Programme. The project is based on a household survey of six countries – Britain, Bulgaria, Germany, Israel, Italy, Norway, the first wave of which was undertaken towards the end of 2001. The aim is to provide comparative information across a range of EU or associate countries on key aspects of behaviour which might have links either to current or future ICT use, as well as to look into subsequent effects. The data include information on family, employment circumstances, ICT access and behaviour, attitudes to and knowledge of computers, education, and leisure or other preferences.

The sample size is 1,750 homes in each country, interviews were by telephone (CATI), except in Bulgaria, and all interviews were conducted with one randomly selected adult aged 16 or over in each home. Telephone interviewing produces lower response rates than face-to-face interviewing. The average response rate across the five countries was around 40%, while in Bulgaria it was over 70%. In wave 2 response rates were over 60% of the wave-1 outcomes. The analysis is based on a weighted version of the data designed to compensate for the bias caused by non-response. However, the weights, for reasons explained below, are only applied to wave 1.

Various elements of the e-Living dataset are used to build a classification of work, including categories for homework and telework based on the three potential elements of a definition discussed above. The first part of our classification relates to location. The survey question asks those in paid work to specify their main place of work. The options are:

1. Mainly work at home
2. Work at work premises
3. Driving or travelling around
4. Or at one or more other places

For simplicity the last two categories are merged into a single category, though this anyway does not form part of our final home/telework classification. The main part of our construction of the schema derives from a series of items relating to frequency of working at home during the day, in evenings and weekends and of using PCs/Internet to do so, and therefore includes measures both of intensity and technology. We then add information on the importance of a mobile phone for the individual’s work (though use of a computer takes primacy over this in the classification scheme). This results in the following categories of worker:

1. People who do any work at home and use the internet to do so (Net Homeworkers, or “Networkers”)
2. People who do any work at home and use a PC to do so (PC Homeworkers)
3. People who say that their mobile is important for their work but are not internet or PC homeworkers (Mobile Users)
4. People who do any work at home during normal work hours but who do not use a PC or the internet for this and do not view the mobile phone as important for work (Day Homeworkers)
5. As in (4) but where undertaken in the evenings or at weekends (Overspill Workers)
6. People who work at one or more workplaces – excluding the home (Workplace, or “Standard” Workers)

Much of the analysis below merges categories 4 and 5. The first of these are in the EcaTT definition “occasional workers”, or in Kraut’s definition (1989) “supplementers”. The second are often called “overspill workers”. In both cases the above scheme treats these as homeworkers, not as teleworkers. Technology is therefore not an issue in this case while the data show that the numbers in (5) are small. In addition, it is probably sometimes difficult to distinguish the two processes in practice, and work flexibility is implied by both categories. There seems little harm in combining the two categories, though distinctions are made between them at various junctures as appropriate.

The overall impact of our classification is that we contrast teleworkers with homeworkers and workplace workers; we make no a priori distinction between occasional or overspill teleworkers and more formally defined teleworkers (therefore excluding a measure of intensity); and we take account of the different technologies which are used to telework (regardless of its function).

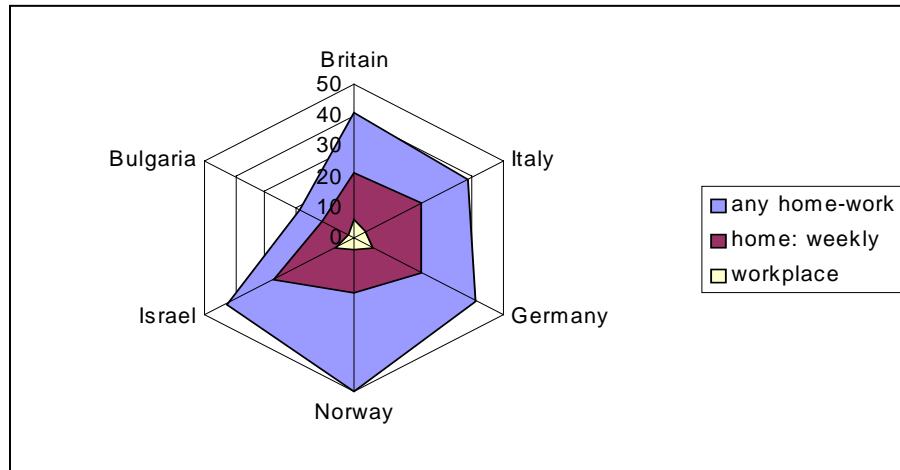
The results

The incidence of teleworking

The focus here is on work at home, though for those for whom a single workplace is not the main place of work, the proportion that works at more than one workplace is several times larger in all countries except Israel than the proportion that works at home. However, while there is increasing interest in the relationship between teleworking and mobile work, most of the work from several places does not involve telework – lorry drivers or builders are typical examples. This means that the locational issue boils down to one of intensity. How much work is undertaken at home? If we take a maximal definition (i.e. including supplementary or spillover work) around two fifths of the work force usually works at home at least part of the week. This provides some basis for estimating the potential demand for teleworking as this is likely to be a subset of homeworkers. The wave-1 variation by intensity in all six countries is shown in Figure 1. As can be seen quite clearly, variation by country is in fact quite limited, but variation across the categories is substantial. This

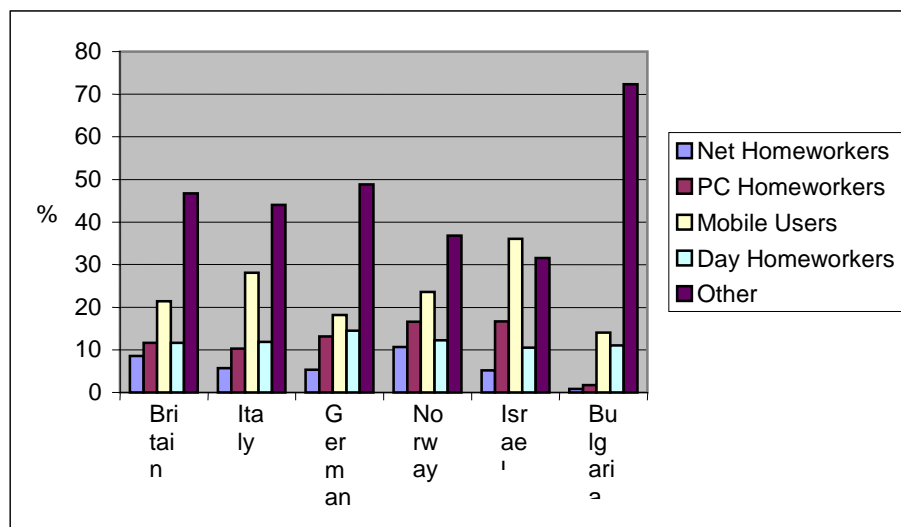
suggests that broadly similar factors drive these distinctions in different types of economy.

Figure 1: % working people with workplace as main place of work, those who work at home at least weekly, and those working at home for any time



The final main element in the definition is technology. The full picture, including this, is shown in Figure 2.

Figure 2: The incidence of tele and homeworking



Two things should be noted. First, the proportion working at the workplace varies from somewhat over 30% to over 70%, though if Bulgaria is excluded the upper limit is 50%. This means that half or more of the workforce in nearly all countries works from home at least part of the week, or at least finds a mobile phone useful for work. The variation between Britain, Germany and Italy is also rather limited and there seems therefore to be some sort of mode effect. Norway and Israel have the lowest proportions. This might reflect a higher national income in the case of the former but it seems reasonable that geographical limitations in Norway and security problems in Israel might be important factors. The second point to note is the variation between countries in the impact of the home and teleworking elements of the classification.

While Israel and Norway have the largest proportions of their workforce who are PC homeworkers, Norway and Britain show the highest proportion of Net homeworkers.

Several things of note are obscured by the above: the role of self-employment, the amount of time spent teleworking, and, as mentioned earlier, the distinction between day and overspill homeworkers. Taking self-employment first, although the ONS report (ONS 2000) claims that the predominance of self-employment in telework is declining (i.e. it is spreading to employees), self-employment explains a large part of teleworking. For instance, in Britain 12% of the sample who are in work are self-employed, but 23% of net workers and 25% of PC homeworkers are self-employed. Only in Israel was the proportion of the self-employed in the labour force reflected roughly equally across the different tele and homework categories. In all other countries (excluding Bulgaria) they are over-represented in net, PC and mobile work. Also of note is that in all countries except Bulgaria the proportion of the self-employed amongst homeworkers was the same as in the labour force. Self-employment is associated with teleworking not with work at home.

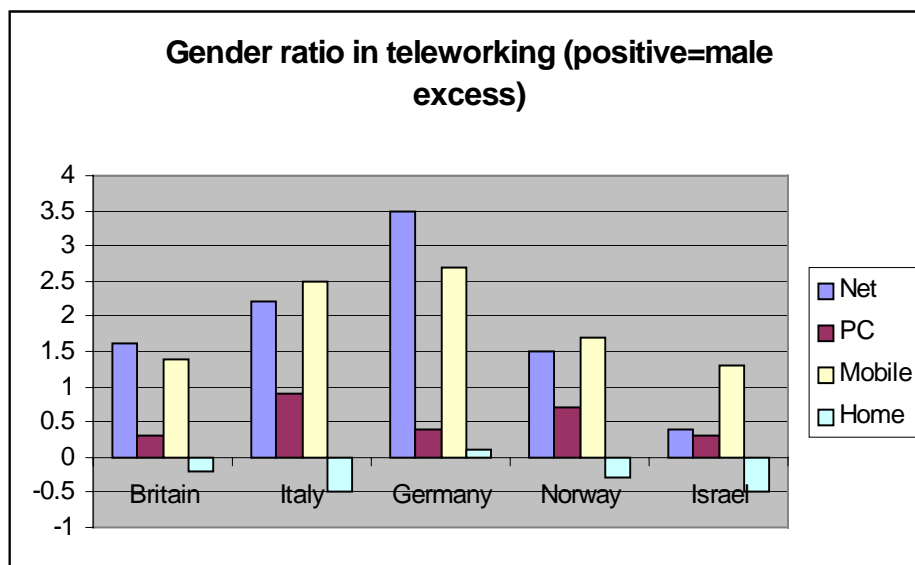
On frequency of work at home, taking work at home at least once weekly occurs in 67% of cases in the UK, 42% in Italy, 22% in Germany and 55% in Norway. Frequency of work at home where this is undertaken at all is far from marginal. This does not tell us for what proportion of work undertaken at home the particular technology is used. 50% of teleworkers (net and PC) in Britain use a PC for their work at home at least half of the time. The figure is 34% for Italy, 37% for Germany, 59% for Norway, and 34% for Israel. Thus at least a third of homework requires a PC for a minimum of half of work at home where telework using a PC is undertaken at all. But even telework does not require use of technology all the time. Telework is fundamentally work at home, for which technology is important but not always necessary. Much the same caveat applies to intensity of work at home. The high frequencies just shown do not mean that in the aggregate much time is spent working at home. Many of these workers work at home only part of their working time and some work only part-time anyway. The average weekly number of hours a week worked at home by someone who mostly uses the net to do so is 16 in Britain, 11 in Italy, 19 in Germany, only 8 in Norway, and 15 in Israel. Not only are the figures low in some countries but they are low across all categories of work. If we were therefore to measure telework on an hourly basis the contribution to total work hours in the population would be small. Finally, and related to this, it was stated above that for most analyses day homeworkers would be combined with overspill or evening/weekend workers (where neither use ICTs for this purpose). This is in part because overspill workers are a small category in absolute terms.

In sum, a strict definition of teleworking radically underestimates the real incidence of homeworking. A definition of teleworking based on location and the form of technology gives a much fuller and more varied picture. Intensity is important though need not be a primary part of any final definition. The result shows high frequency of home and teleworking, with a substantial share coming from self-employment, though the total number of hours spent working at home at all is not high, and nor is computer technology used for the larger part of this work.

The characteristics of teleworkers

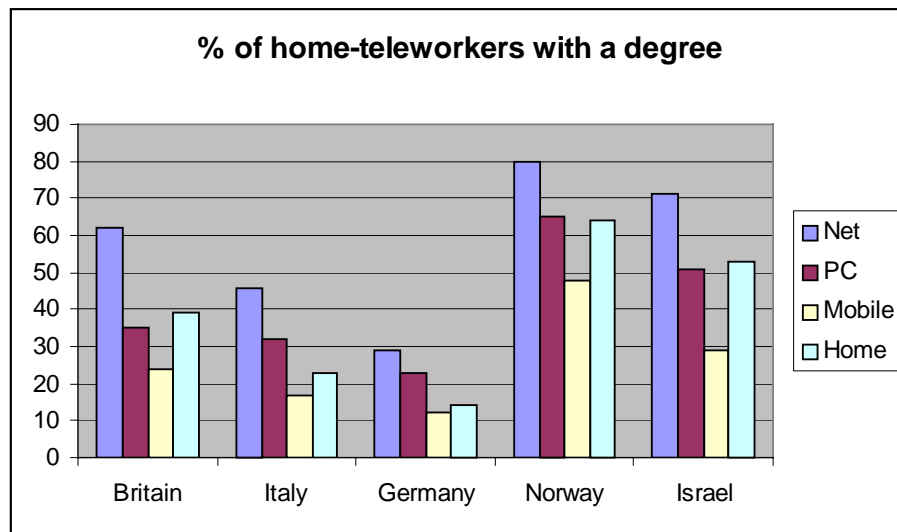
The age distribution is roughly equal across the various work categories defined above. Age is, therefore, not a factor we need consider. But there are clear gender differentials, which are apparent from Figure 3. Teleworking is largely male. Net-based teleworking is overwhelmingly male in all countries except Israel. PC homeworking is generally male but less overwhelmingly. Mobile use for work is about as male-dominated as net-based telework. Homeworkers who do not use ICTs for this are largely female. All these groups can be assessed in comparison with workplace workers, in which the gender divide is about equal. Women tend to fall in to the traditional homework category while men are strongly over-represented in the non-traditional forms of work outside the workplace where the new ICTs are used. This is not explained by the fact that men are more likely to be self-employed and that the self-employed are more likely to telework. More generally, the ONS study (ONS 2002) makes the point that the occupational and industrial distributions of men and women do not explain the gender difference in teleworking in the UK. Looking at the employed by themselves in eLiving (i.e. excluding the self-employed), the male bias remains strong in the three teleworking categories but disappears amongst homeworkers.

Figure 3: Gender ratio in teleworking



Does the gender bias shown above mean that teleworking reflects professional, well-paid work while predominantly female homworking is the reverse? This can be tested through looking at the proportion of each category with a degree, shown in Figure 4.

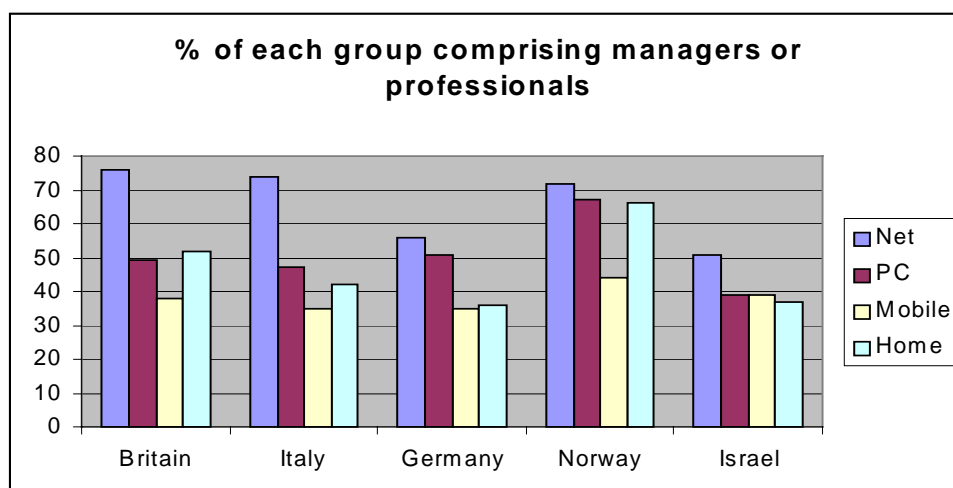
Figure 4: Percentage of home-teleworkers with a degree



It is clear that in all countries net-homeworking is very much a graduate activity, as is PC-homeworking, though less overwhelmingly. In the case of mobile use there is roughly parity in the comparison with the labour force as a whole, though in Israel these people are less likely to be graduates. But technology does not explain everything. Homeworkers also tend to be more highly educated than the labour force in general. In other words, homeworking of any sort is quite likely to be undertaken by graduates. Non-ICT based homeworking does not appear to be undertaken by people with low levels of education and who might as a consequence be expected to be doing poorly paid and routine work.

The ONS study in Britain found that teleworking is dominated by managerial, professional and associate professional/technical workers. However, there were over 300,000 teleworkers amongst the skilled trades - compared to over 500,000 teleworking professionals (ONS 2002). In most e-Living countries roughly three quarters of net homeworkers are managers or professional workers. In each country the proportion of PC-homeworkers is less predominantly managerial and professional than this, but still well above average for the labour force.

Figure 5: Percentage of each group comprising managers and professionals



Homeworkers are broadly similar to this, while mobile users have roughly the same profile as the rest of the labour force.

No occupational groups other than professional or managerial workers consistently has a higher proportion of either teleworkers or homeworkers than appears in the labour force in general. Technicians, for instance, not only have roughly the same proportion of net or PC homeworkers as general workers in all countries, but the proportion is also roughly the same for mobile users and homeworkers. Clerical workers are nearly always under-represented on all forms of tele or homework, which suggests that telework is not a basis for paid domestic drudgery. The mobile phone is of some significance for craft workers, which implies a fairly strong occupational basis for this technology.

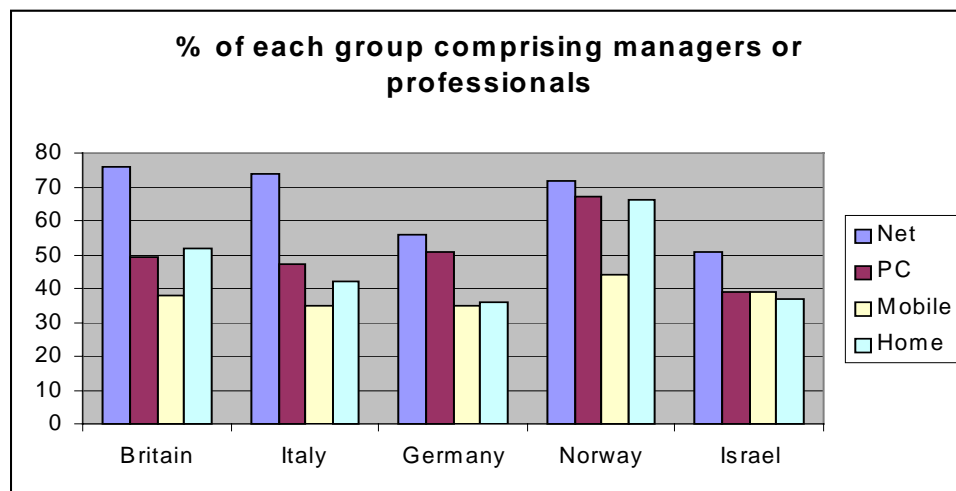
In sum, teleworking is overwhelmingly a managerial and professional usage, while the mobile phone, while also important to this group, is more strongly used by craft workers. This suggests that teleworking reflects social status and is perhaps a perk of the job, or is an aspect of the ability of people in such work to work flexibly. It reflects, therefore, the current distribution of social status, and little more. However, the fact that homeworkers often have degrees also suggests that this category, while involving a higher proportion of women than the other forms, is not a form of low-status and routine work. Moreover, in Germany, 20% of net workers were engaged in blue-collar work as were around 17% of PC workers in Britain, Italy and Germany. This would make sense in the case of self-employment, but it equally shows that there is no straightforward link between telework and professional or managerial status.

This further implies that teleworking is not associated with productivity. The idea that teleworking is in its own right a factor of production can only be tested with far more comprehensive data than in eLiving or that probably exist anywhere. If employers pay certain categories of worker more than others then this presumably reflects their differential productivity as measured by pay. But the direct productivity effects are far from certain. Would it be caused by teleworking itself (for instance, the ability of people to work better or more flexibly at home) or the fact that more able, motivated or experienced workers are likely to be teleworkers? Looking at this in terms of subjective indicators Akselsen et al (2001) show a positive relationship between work at home and workers' assessment of job performance, though female employees are perceived to be less effective the more days they work at home. This clearly is only a perception and implies that women are more "invisible" than men when they work at home. Moreover, Hartman, Stoner and Arora demonstrate in their study of variables affecting telecommuting productivity a "...lack of significant relationships between demographic and occupational variables and telecommuting productivity" (Hartman, Stoner and Arora 1991: 224).

We can at least regress wages on the tele-homework categories, plus a range of characteristics which we might hope control for some of the background factors such as education and occupation, in the hope that any differences between the categories that remain are genuinely a reflection of their effects and not of the control variables. Although it is quite possible that with more information on the personal and professional characteristics of the respondents, these differences would disappear, the

range of controls used here is quite extensive, so there are some grounds for optimism. This analysis is undertaken through ordinary least squares regression. It in effect reverses the direction of the previous analyses. There the issue of interest was the factors associated with someone's participation in home or telework. Here it is the effect of this participation on pay. The figures given in Figure 6 are the number of euros per hour earned by people in each category of work over and above what they would earn given their gender, age, education, PC skills, occupation and industry. Only the results for the home and teleworking categories are shown and the self-employed are excluded for the reasons given previously.

Figure 6: Contribution of teleworking modes to hourly pay (euros) of net, PC and home-workers (OLS regression coefficients)



Here we have a very varied picture. The category of work which is excluded - those who work in the workplace - is the group of people to whom the other groups are being compared. In Germany and Norway online teleworkers clearly earn a lot more regardless of their education and type of job. It is possible that these workers are seen as more productive by their employers or conversely that net homworking is a 'perk' awarded to (or demanded by) the most valued and hence highly paid. In Italy there are no homworking effects at all. In Britain, PC homworkers earn less than other categories of home and teleworker. It is not the case, therefore, that teleworking is always associated with higher pay - and therefore presumably higher productivity - though it sometimes is. PC homworking is not that well paid relative to other categories of work once the background and other characteristics of the various workers are taken into account, and seems to be rewarded less even than plain homworking. Again, this may confirm Stanworth's taxonomy.

The effects of time

All the above analyses are of wave 1 and therefore static. If the telework classification is to be treated as reliable it must hold up at least over short periods of time. The

inclusion on wave 2 of eLiving enables this test to be undertaken.¹ In Table 1 we can first of all see that in absolute terms the classification produces much the same result if we treat the two waves as two separate cross-sections.²

Table 1: Percentage of the longitudinal sample in different categories of tele and home-work in waves 1 and 2 (unweighted data; all countries pooled; columns total 100%)

	Wave 1	Wave 2
Net worker	7	6
PC worker	13	12
Day worker	16	15
Evening worker	5	5
Home worker	59	62
<i>N</i>	5782	3904

However, this masks a lost of change. It reflects the net impact of changes both in and out of the telework categories which to some extent cancel out. The gross changes are fairly considerable. This is demonstrated in Table 2 (which combines all home-work, whether in the day or evening or weekend, for simplicity of presentation).

Table 2: Change in the (simplified) classification over wave 1-2 (all countries pooled; columns total 100%)

	Net	PC	Home	Standard	<i>N</i>
Net	43	10	8	1	228
PC	24	41	11	4	403
Home	22	22	41	13	716
Standard	10	27	40	82	2120
<i>N</i>	250	403	744	2070	3467

Only 43% of “networkers” in wave 1 remained networkers in wave 2. A similar picture applies to PC workers and to home-workers, while as many as 27% of the former and 40% of the latter become standard workers. 82% of standard workers remain as such, but this is the biggest category of course, so the absolute number of switchers to other categories is large.

This degree of flux suggest that the categories are not stable. Yet this by no means undermines the validity of the classification. It shows what is very often the case in panel data, that stable cross-sectional results are the outcome of often a great deal of switches across boundaries. Much of this switching is small-scale. In the case of telework, the picture we get is one of perhaps constant movement in and out of forms of work according to immediate circumstances. People are not net or PC workers as

¹ But using unweighted data as wave 2 has only just become available. Weights have not been established, while the data are also at this stage provisional. Findings are therefore indicative only.

² As the question on importance of a mobile telephone for work was cut in wave 2 to make room for other questions, the category “mobile worker” is eliminated from the longitudinal analysis.

such but, rather, frequently vary their use of the net or PC at home for work purposes. The categories are stable but individuals move across these fairly constantly. They are rather loose bundles of behaviour which attract particular types of worker. Instead of people being networkers consistently over time they are networkers at different points in time. Thus, in general, anyone “networking” at any time is likely to be different from those never networking. This is demonstrated in Table 3. Each column indicates the direction taken by the coefficients of a logistic regression equation where the dependent variable is, in the first three columns, staying a standard worker over the two waves rather than (1) being in any other category, (2) moving from standard to non-standard, and (3) becoming a networker; and in the last three columns, never being a networker compared to (1) becoming a networker, (2) staying a networker, and (3) becoming a non-networker.

Table 3: Direction of logistic regression coefficients for (1) “staying a standard worker” compared to 3 other types of worker, and (2) “never being a net teleworker”, compared to 3 other types of worker

	Stay standard			Never net worker		
	All others	Become non standard	Become net worker	Become net worker	Stay net worker	Become non-net
Male	+	-	+	+	-	+
Age	+ [*]	+	+	+	+	+
UK	+	-	-	- ^(*)	-	-
Italy	+	-	-	-	-	-
Germany	+	-	-	- ^(*)	-	-
Norway	+ ^(*)	-	-	- ^(*)	- ^{***}	-
Israel	- ^(*)	-	-	-	-	-
Uses home PC	- ^{***}	-	-	-	+ ^{***}	+
PC skills	- ^{**}	- ^{***}	- ^{***}	- ^{**}	+ [*]	- ^{**}
Education	- ^{**}	-	- ^{**}	- ^{**}	+ ^(*)	-
Manager	- ^{***}	- ^{***}	-	- ^{***}	+ ^{***}	+ ^{***}
Technician	-	- ^{**}	-	-	+ ^{***}	+
Clerical	+ ^(*)	-	-	-	+	+
Service	- ^{**}	-	-	+	+	+
Work hours	+	+ [*]	+	-	-	+
Monthly pay	- ^{***}	- ^{***}	- ^{***}	- ^{**}	+ ^{***}	+
N	3466	1412	1342	1864	1704	1848
Pseudo R²	9%	10%	25%	15%	13%	28%

Note: * = p <.05; ** = p <.01; *** = p <.001

Looking at the first three columns it is apparent that the three models are virtually the same. It barely matters whether we compare people who remain standard workers to all others (those who stay in other categories or move across categories): their personal characteristics, occupations, education and pay are likely to be similar. Nor does it matter which country they are in. In other words, someone who remains a standard worker over time has a distinctive profile whatever other type of worker this person is compared to. This strongly implies that only specific types of people are likely to stay in standard forms of work over time: as examples, they are unlikely to be managers or technicians, or to have high levels of education or PC skills, or to be highly paid.

Much the same applies when we compare the fourth column to the third. Those who never become networkers are a narrower group than those who remain standard workers but seem similar to the latter at least when compared to those who become networkers (as the comparison group is the same in both the third and fourth columns). To put this another way, people who become a networker are similar whether compared to those who remain standard or those who never network. The picture, changes, though, in the fifth column and to some extent in the sixth. Those who become networkers are not similar to those who remain networkers. The former are unlikely to be managers or to be highly educated or highly paid, while the latter are the reverse in all three cases, while those who move away from networking are in two cases. It is not the case, therefore, that anybody who does networking at any time in the two-year period is likely to have particular characteristics denoting a managerial/professional role and background. Those who move into this mode have the characteristics (measured in wave 1) of the type of work they are moving from rather than to. This suggests that there is some movement (possibly short-lived, though this cannot be known from these data) into this mode by a range of different types of people, but less so out of this mode, while those who are consistently networkers are clearly managerial or professional. Others dip into this mode.

The use of wages as an explanatory variable in Table 3 assumes that pay levels tell us something about either the person or the job of those in particular home/telework categories. Moving now to use of wages as the dependent variable and the home/telework categories as explanatory variables conveys much the same information, merely expressed the other way round. There is a potential interpretative difference in the second way of doing this, however, insofar as we assume some causal direction. It is possible that different components of the classification “cause” the wage differences. While this would be a strong assumption with little real grounding, we can at least get a comparison between the effects of the different categories which was impossible before in running separate models for each comparison. Insofar as differences exist in their effects it is possible that some of this is causal (perhaps representing a productivity impact) rather than simply telling us something about people who are, for instance, attracted into different form of home or telework.

The results are shown separately for each country in Table 4.

Table 4: OLS regression coefficients for impact in six countries of tele/homeworking categories on gross monthly wages (in euros; reference category=standard worker both waves)

<i>W1</i>	<i>W2</i>	UK	Italy	Germany	Norway	Bulgaria	Israel
<i>Net</i>	<i>Net</i>	634**	-51	390	399**	149***	363*
<i>Net</i>	<i>Home</i>	186	27	218	235	-9	67
<i>Net</i>	<i>Standard</i>	-302	176	109	226	0	-446*
<i>Home</i>	<i>Home</i>	613**	61	305	173***	0	733***
<i>Home</i>	<i>Net</i>	870**	-123	311	904	-18	359
<i>Home</i>	<i>Standard</i>	191	-57	-87	-120	1	54
<i>Standard</i>	<i>Net</i>	-134	-859	164	-112	23	124
<i>Standard</i>	<i>Home</i>	-204	703**	8	-29	15	165

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$

In the German case none of the coefficients reach normal levels of statistical significance, and so these results can be discounted. In four countries those who remain networkers in both waves have a large, positive and statistically significant wage benefit (which is large and positive in Germany too, though statistically insignificant). This strongly supports the previous finding that these are well-paid, professional or managerial people. Of more interest is the finding that those who remain home-workers also exhibit a generally positive and significant effect, which is on average even larger. It is therefore not telework as such which has a strong and positive association but work at home, some of which is telework. None of the other results (reading across the rows) seems consistent, with the possible exception of those who move from being net to standard workers. In the UK and Israel this is associated with a large negative coefficient, which is also statistically significant. Although in other countries the sign is in the opposite direction, in none of these is the result significant statistically. It is possible that this switch reflects some change in the work situation which results both in loss of work at home as a networker and a relatively low level of pay. This is highly conjectural. It is more reasonable to infer from this analysis that the moves across tele/homeworking categories are not in general associated with clearcut differences in pay, whichever is cause or effect, but that stable situations are associated with such differences. There is a type of worker who either works at home without any element of teleworking, or who uses the internet to work at home, and receives relatively high pay, even after controlling for both occupation and education, for doing the type of job where such work is likely to be undertaken.

Conclusion

Telework is not a homogeneous entity but can comprise different elements of technology, location and intensity whose different combinations produce a range of types of work – telework modes, work at home, or work at a standard workplace. However, in general it seems best, if we are to understand the true potential role of

telework, not to predetermine any specific level of intensity in forming a definition of telework but, rather, to take as the major elements both technology and location, and to allow that these forms vary by intensity in practice.

That such differences exist is clear from the analyses presented here, which show that there are educational, educational and pay differences between the categories of the classification discussed in the beginning of the paper. In other words, the categories are populated by different people with different personal or occupational characteristics. Networkers are likely to be male, professional and relatively highly paid. PC workers are of significantly lower social status than networkers. Homeworkers, where women are slightly in the majority, are also, unexpectedly, likely to be of high social status. They seem to be similar to networkers but work at home in a different way.

The longitudinal analysis suggest that categories are stable over time but not their incumbency. There is considerable movement of individuals across boundaries of the classification scheme which tends to cancel out, thereby giving the classification scheme its stability. In general, though, there is more stability of personnel than this suggests because people who are either consistently in a category, or move in or out of this, tend to have roughly similar characteristics. This strongly implies that the scheme does not denote permanent types of worker but, rather, permanent types of work into which some sorts of people, but not others, are intermittently likely to participate. The exception comes with two categories: networking and home-working, which are the most socially prestigious and well paid categories, somewhat above other categories denoting movement into or out of these modes. Moreover, those who move into networking are distinctively different from the average networker – having lower education, occupational status, and pay. Networking is not necessarily associated with high prestige but can be undertaken by other workers. Persistent networking, though, is for those with greater prestige.

It is impossible to say whether networking's generally higher rewards reflects a productivity effect or a privilege of the position. However, if people choose to work from home in this way, presumably they consider themselves to be more productive in doing so. Their higher pay reflects their better performance, which is supported by their commitment to work at home using a net link. That the latter is not necessary, though, is demonstrated by similar rewards accruing to homeworkers, while PC workers, who presumably exhibit similar commitment, are presumably paid less because they are in less well paid types of work. Overall, it would appear that the classification scheme discussed above derives from pre-existing differences in occupational traits and add little that is distinctive. However, telework perhaps reinforces these pre-existing differences. It would not take a great move towards more telework for such activity to become a defining characteristic of well-paid, professional work. In that sense, telework may well in time become both a socially and economically significant process.

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